



SDMS Doc ID 165961

*from Annie*

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## Additional Work Needed to Close Data Gaps in Perchlorate Toxicology and Ecological Systems

Update: 05 February 2000

Activity and Lead Agency	Objective	Status	Schedule
<p>1. Pathology Working Group (PWG)</p> <p><i>EPA / NIEHS</i></p>	Develop consistent nomenclature and scoring system for reading of thyroid and brain slides across all toxicology studies.	The PWG has been identified by NTP, currently providing QA/QC and review of available slides.	<p>First testing strategy study set and new immunotoxicity study thyroids scheduled for March 13-15, 2000.</p> <p>Brain PWG awaits completion of new "effects" protocol.</p> <p>Same nomenclature and scoring will be applied to thyroids from "effects" protocol and other relevant studies.</p>
<p>2. Immunotoxicity Studies</p> <p><i>PSG : Burleson Research Technologies / Air Force Research Labs, Wright-Patterson AFB (hormone analysis)</i></p>	Repeat of Sheep Red Blood Cell (SRBC) assay due to deficiencies in original study. Conducting an additional assay that evaluates delayed-typed hypersensitivity.	Study in progress	First set of slides to PWG. Second set of slides one month after the first set. First set of serum samples (90-Day) sent to Air Force Research Lab (AFRL) in Sept for analysis. Second set of serum samples (14-day) due in Dec / Jan 00. Completion serum analysis: (90-day) - 23 Dec 99, (14-day) - 1 Mar 00.
<p>3. Adult Male Rat Study and PK Model Development</p> <p><i>DoD : AFRL WPAFB</i></p>	Model inhibition mechanism plus hormone changes in adult male rats.	Initial model almost complete	Study complete. Currently working on comprehensive adult rat model. Data package by 15 March 00.
<p>4. Pregnant Lactating Female Rat Study and PBPK Model Development</p> <p><i>DoD : AFRL WPAFB</i></p>	Model inhibition mechanism plus hormone changes in adult female rats during pregnancy and lactation (critical effect seen during lactation in first study set). Extension necessary to evaluate dosimetry for current critical effect in pups.	Protocol development complete	Study in progress. First data set available 1 March 00, additional data sets through August 00.

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5. Motor Activity Study in Pups <i>DoD : US Navy</i>	Repeat data set due to high variability in the original study.	Baseline studies in progress by Navy	Study in progress. Data available 1 June 00.
6. Interlab Hormone Analysis Validation <i>DoD : AFRL WPAFB</i>	Achieve consistency in hormone analysis between laboratories.	Study in progress	Data available 15 January 00.
7. Human PK Model Phase I <i>DoD : AFRL WPAFB</i>	Model inhibition mechanism plus hormone changes in adult male humans; single exposures and repeated (14-day) regimen.	Initial model developed based on literature and preliminary human data	Preliminary Human PK Model Theoretical model in progress. Data available 15 March 00. Inclusion of Brabant Human Study results into Human PK Model by 1 June 00.
8. Human PK /RAIU Study <i>PSG : Oregon Health Sciences University (UHSU)</i>	Supports Human PK Model Phase II (AFRL WPAFB) with iodide uptake inhibition mechanism plus hormone changes in adult male humans; repeated (14-day) regimen.	Protocol complete and undergoing UHSU IRB review	Schedule pending. Data sets to be delivered incrementally to AFRL.
9. Perchlorate Effects Study <i>PSG : Premedica Labs (Argus)</i>	Examines brains, thyroids, and hormones during key developmental stages in rats that correspond to time points in Study 4. Will meet data base requirements of guideline developmental study in second species.	Contract awarded	Animals put on test December 28, 99. Final round of comments addressed 01/07/00. Data available 1 June 00.

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<p>10. Site Specific Ecological Impacts Investigation</p> <p><i>DoD : Brooks AFB</i></p>	<p>Obtain baseline analysis of eco systems in known affected areas: Lake Mead, Nevada; Indian Head, Maryland; specific portions of the lower Colorado River; McGregor, Texas; and White Sands, New Mexico. Sites should be representative of soil types and climate considerations.</p>	<p>Protocol development in progress</p>	<p>Schedule to be determined upon completion of protocols in January 00.</p>
<p>11. Farm Gate Food Analysis</p> <p><i>DoD : Brooks AFB</i></p>	<p>Evaluate potential impact to crops in areas where irrigation water contains perchlorate and representative of climate and soil types: corn, soy, oranges, milk and lettuce. Representative of farming practice and growing season (harvest). Factors governing uptake and potential bioaccumulation, soil conditions and mass balance to be characterized. Requires extension and validation of analytical methods to plant and animal tissues.</p>	<p>Funding approved Coordinating with USDA/EPA/State Parties</p>	<p>3<sup>rd</sup> or 4<sup>th</sup> quarter 00 if funding received in 1<sup>st</sup> quarter 00.</p>
<p>12. Soil Column Study</p> <p><i>EPA : NERL Athens (under contract with the USAF)</i></p>	<p>Analysis of perchlorate transport within various types of soil columns.</p>	<p>Funding approved</p>	<p>Schedule to be determined.</p>
<p>13. Developmental embryonic toxicology in amphibians.</p> <p><i>University of Oklahoma (under contract with the USAF)</i></p>	<p>Determines a concentration/response curve for amphibians exposed to perchlorate and determine the ability of perchlorate to bioaccumulate in amphibians.</p>	<p>Funding approved</p>	<p>Schedule to be determined.</p>

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14. Phytoremediation of perchlorate by woody plants  <i>University of Georgia (under contract with the USAF)</i>	Investigate degradation of perchlorate in woody plants.	Funding approved	Schedule to be determined.
15. Analytical detection capability and validation (groundwater, blood, urine, soy, citrus etc).  <i>EPA : NERL Athens, NRMRL DoD : AFRL WPAFB and Brooks AFB</i>	Maintain credibility in detection capabilities.	Funding approved	On going activities including drinking and groundwater, urine and blood. Plant and animal tissues still in coordination.
16. Treatment Technology  <i>DoD : Tyndall AFB with industry partnership</i>	Coordinate cleanup technology development.	Funding approved	In the process of setting up meeting with technology group.